



Chapter

3

What Is Money?

PREVIEW

If you had lived in America before the Revolutionary War, your money might have consisted primarily of Spanish doubloons (silver coins that were also called *pieces of eight*). Before the Civil War, the principal forms of money in the United States were not only gold and silver coins but also paper notes, called *banknotes*, issued by private banks. Today, you use not only coins and dollar bills issued by the government as money, but also checks written on accounts held at banks. Money has been different things at different times; however, it has *always* been important to people and to the economy.

To understand the effects of money on the economy, we must understand exactly what money is. In this chapter, we develop precise definitions by exploring the functions of money, looking at why and how it promotes economic efficiency, tracing how its forms have evolved over time, and examining how money is currently measured.

Meaning of Money

As the word *money* is used in everyday conversation, it can mean many things, but to economists, it has a very specific meaning. To avoid confusion, we must clarify how economists' use of the word *money* differs from conventional usage.

Economists define *money* (also referred to as the *money supply*) as anything that is generally accepted in payment for goods or services or in the repayment of debts. Currency, consisting of dollar bills and coins, clearly fits this definition and is one type of money. When most people talk about money, they're talking about **currency** (paper money and coins). If, for example, someone comes up to you and says, "Your money or your life," you should quickly hand over all your currency rather than ask, "What exactly do you mean by 'money'?"

To define money merely as currency is much too narrow for economists. Because checks are also accepted as payment for purchases, checking account deposits are considered money as well. An even broader definition of money is often needed, because other items such as savings deposits can in effect function as money if they can be quickly and easily converted into currency or checking account deposits. As you can see, there is no single, precise definition of money or the money supply, even for economists.

To complicate matters further, the word *money* is frequently used synonymously with *wealth*. When people say, “Joe is rich—he has an awful lot of money,” they probably mean that Joe has not only a lot of currency and a high balance in his checking account but has also stocks, bonds, four cars, three houses, and a yacht. Thus while “currency” is too narrow a definition of money, this other popular usage is much too broad. Economists make a distinction between money in the form of currency, demand deposits, and other items that are used to make purchases and **wealth**, the total collection of pieces of property that serve to store value. Wealth includes not only money but also other assets such as bonds, common stock, art, land, furniture, cars, and houses.

People also use the word *money* to describe what economists call *income*, as in the sentence “Sheila would be a wonderful catch; she has a good job and earns a lot of money.” **Income** is a *flow* of earnings per unit of time. Money, by contrast, is a *stock*: It is a certain amount at a given point in time. If someone tells you that he has an income of \$1,000, you cannot tell whether he earned a lot or a little without knowing whether this \$1,000 is earned per year, per month, or even per day. But if someone tells you that she has \$1,000 in her pocket, you know exactly how much this is.

Keep in mind that the money discussed in this book refers to anything that is generally accepted in payment for goods and services or in the repayment of debts and is distinct from income and wealth.

Functions of Money

Whether money is shells or rocks or gold or paper, it has three primary functions in any economy: as a medium of exchange, as a unit of account, and as a store of value. Of the three functions, its function as a medium of exchange is what distinguishes money from other assets such as stocks, bonds, and houses.

Medium of Exchange

In almost all market transactions in our economy, money in the form of currency or checks is a **medium of exchange**; it is used to pay for goods and services. The use of money as a medium of exchange promotes economic efficiency by minimizing the time spent in exchanging goods and services. To see why, let’s look at a *barter economy*, one without money, in which goods and services are exchanged directly for other goods and services.

Take the case of Ellen the Economics Professor, who can do just one thing well: give brilliant economics lectures. In a barter economy, if Ellen wants to eat, she must find a farmer who not only produces the food she likes but also wants to learn economics. As you might expect, this search will be difficult and time-consuming, and Ellen might spend more time looking for such an economics-hungry farmer than she will teaching. It is even possible that she will have to quit lecturing and go into farming herself. Even so, she may still starve to death.

The time spent trying to exchange goods or services is called a *transaction cost*. In a barter economy, transaction costs are high because people have to satisfy a “double coincidence of wants”—they have to find someone who has a good or service they want and who also wants the good or service they have to offer.

Let's see what happens if we introduce money into Ellen the Economics Professor's world. Ellen can teach anyone who is willing to pay money to hear her lecture. She can then go to any farmer (or his representative at the supermarket) and buy the food she needs with the money she has been paid. The problem of the double coincidence of wants is avoided, and Ellen saves a lot of time, which she may spend doing what she does best: teaching.

As this example shows, money promotes economic efficiency by eliminating much of the time spent exchanging goods and services. It also promotes efficiency by allowing people to specialize in what they do best. Money is therefore essential in an economy: It is a lubricant that allows the economy to run more smoothly by lowering transaction costs, thereby encouraging specialization and the division of labor.

The need for money is so strong that almost every society beyond the most primitive invents it. For a commodity to function effectively as money, it has to meet several criteria: (1) It must be easily standardized, making it simple to ascertain its value; (2) it must be widely accepted; (3) it must be divisible, so that it is easy to "make change"; (4) it must be easy to carry; and (5) it must not deteriorate quickly. Forms of money that have satisfied these criteria have taken many unusual forms throughout human history, ranging from wampum (strings of beads) used by Native Americans, to tobacco and whiskey, used by the early American colonists, to cigarettes, used in prisoner-of-war camps during World War II.¹ The diversity of forms of money that have been developed over the years is as much a testament to the inventiveness of the human race as the development of tools and language.

Unit of Account

The second role of money is to provide a **unit of account**; that is, it is used to measure value in the economy. We measure the value of goods and services in terms of money, just as we measure weight in terms of pounds or distance in terms of miles. To see why this function is important, let's look again at a barter economy where money does not perform this function. If the economy has only three goods—say, peaches, economics lectures, and movies—then we need to know only three prices to tell us how to exchange one for another: the price of peaches in terms of economics lectures (that is, how many economics lectures you have to pay for a peach), the price of peaches in terms of movies, and the price of economics lectures in terms of movies. If there were ten goods, we would need to know 45 prices in order to exchange one good for another; with 100 goods, we would need 4,950 prices; and with 1,000 goods, 499,500 prices.²

Imagine how hard it would be in a barter economy to shop at a supermarket with 1,000 different items on its shelves, having to decide whether chicken or fish is a better buy if the price of a pound of chicken were quoted as 4 pounds of butter and the price of a pound of fish as 8 pounds of tomatoes. To make it possible to compare

¹An extremely entertaining article on the development of money in a prisoner-of-war camp during World War II is R. A. Radford, "The Economic Organization of a P.O.W. Camp," *Economica* 12 (November 1945): 189–201.

²The formula for telling us the number of prices we need when we have N goods is the same formula that tells us the number of pairs when there are N items. It is

$$\frac{N(N-1)}{2}$$

In the case of ten goods, for example, we would need

$$\frac{10(10-1)}{2} = \frac{90}{2} = 45$$

prices, the tag on each item would have to list up to 999 different prices, and the time spent reading them would result in very high transaction costs.

The solution to the problem is to introduce money into the economy and have all prices quoted in terms of units of that money, enabling us to quote the price of economics lectures, peaches, and movies in terms of, say, dollars. If there were only three goods in the economy, this would not be a great advantage over the barter system, because we would still need three prices to conduct transactions. But for ten goods we now need only ten prices; for 100 goods, 100 prices; and so on. At the 1,000-good supermarket, there are now only 1,000 prices to look at, not 499,500!

We can see that using money as a unit of account reduces transaction costs in an economy by reducing the number of prices that need to be considered. The benefits of this function of money grow as the economy becomes more complex.

Store of Value

Money also functions as a **store of value**; it is a repository of purchasing power over time. A store of value is used to save purchasing power from the time income is received until the time it is spent. This function of money is useful, because most of us do not want to spend our income immediately upon receiving it, but rather prefer to wait until we have the time or the desire to shop.

Money is not unique as a store of value; any asset—whether money, stocks, bonds, land, houses, art, or jewelry—can be used to store wealth. Many such assets have advantages over money as a store of value: They often pay the owner a higher interest rate than money, experience price appreciation, and deliver services such as providing a roof over one's head. If these assets are a more desirable store of value than money, why do people hold money at all?

The answer to this question relates to the important economic concept of **liquidity**, the relative ease and speed with which an asset can be converted into a medium of exchange. Liquidity is highly desirable. Money is the most liquid asset of all because it is the medium of exchange; it does not have to be converted into anything else in order to make purchases. Other assets involve transaction costs when they are converted into money. When you sell your house, for example, you have to pay a brokerage commission (usually 5% to 7% of the sales price), and if you need cash immediately to pay some pressing bills, you might have to settle for a lower price in order to sell the house quickly. Because money is the most liquid asset, people are willing to hold it even if it is not the most attractive store of value.

How good a store of value money is depends on the price level, because its value is fixed in terms of the price level. A doubling of all prices, for example, means that the value of money has dropped by half; conversely, a halving of all prices means that the value of money has doubled. During inflation, when the price level is increasing rapidly, money loses value rapidly, and people will be more reluctant to hold their wealth in this form. This is especially true during periods of extreme inflation, known as **hyperinflation**, in which the inflation rate exceeds 50% per month.

Hyperinflation occurred in Germany after World War I, with inflation rates sometimes exceeding 1,000% per month. By the end of the hyperinflation in 1923, the price level had risen to more than 30 billion times what it had been just two years before. The quantity of money needed to purchase even the most basic items became excessive. There are stories, for example, that near the end of the hyperinflation, a wheelbarrow of cash would be required to pay for a loaf of bread. Money was losing its value so rapidly that workers were paid and given time off several times during the day to spend their wages before the money became worthless. No one wanted to hold

on to money, and so the use of money to carry out transactions declined and barter became more and more dominant. Transaction costs skyrocketed, and as we would expect, output in the economy fell sharply.

Evolution of the Payments System

www.federalreserve.gov/paymentsys.htm

This site reports on the Federal Reserve's policies regarding payments systems.

We can obtain a better picture of the functions of money and the forms it has taken over time by looking at the evolution of the **payments system**, the method of conducting transactions in the economy. The payments system has been evolving over centuries, and with it the form of money. At one point, precious metals such as gold were used as the principal means of payment and were the main form of money. Later, paper assets such as checks and currency began to be used in the payments system and viewed as money. Where the payments system is heading has an important bearing on how money will be defined in the future.

Commodity Money

To obtain perspective on where the payments system is heading, it is worth exploring how it has evolved. For any object to function as money, it must be universally acceptable; everyone must be willing to take it in payment for goods and services. An object that clearly has value to everyone is a likely candidate to serve as money, and a natural choice is a precious metal such as gold or silver. Money made up of precious metals or another valuable commodity is called **commodity money**, and from ancient times until several hundred years ago, commodity money functioned as the medium of exchange in all but the most primitive societies. The problem with a payments system based exclusively on precious metals is that such a form of money is very heavy and is hard to transport from one place to another. Imagine the holes you'd wear in your pockets if you had to buy things only with coins! Indeed, for large purchases such as a house, you'd have to rent a truck to transport the money payment.

Fiat Money

The next development in the payments system was *paper currency* (pieces of paper that function as a medium of exchange). Initially, paper currency carried a guarantee that it was convertible into coins or into a quantity of precious metal. However, currency has evolved into **fiat money**, paper currency decreed by governments as legal tender (meaning that legally it must be accepted as payment for debts) but not convertible into coins or precious metal. Paper currency has the advantage of being much lighter than coins or precious metal, but it can be accepted as a medium of exchange only if there is some trust in the authorities who issue it and if printing has reached a sufficiently advanced stage that counterfeiting is extremely difficult. Because paper currency has evolved into a legal arrangement, countries can change the currency that they use at will. Indeed, this is currently a hot topic of debate in Europe, which has adopted a unified currency (see Box 1).

Major drawbacks of paper currency and coins are that they are easily stolen and can be expensive to transport in large amounts because of their bulk. To combat this problem, another step in the evolution of the payments system occurred with the development of modern banking: the invention of *checks*.

Checks

A check is an instruction from you to your bank to transfer money from your account to someone else's account when she deposits the check. Checks allow transactions to

Box 1: Global**Birth of the Euro: Will It Benefit Europe?**

As part of the December 1991 Maastricht Treaty on European Union, the European Economic Commission outlined a plan to achieve the creation of a single European currency starting in 1999. Despite concerns, the new common currency—the euro—came into existence right on schedule in January 1999, with 11 of the 15 European Union countries participating in the monetary union: Austria, Belgium, Finland, France, Germany, Italy, Ireland, Luxembourg, the Netherlands, Portugal, and Spain. Denmark, Sweden, and the United Kingdom chose not to participate initially, and Greece failed to meet the economic criteria specified by the Maastricht Treaty (such as having a budget deficit less than 3% of GDP and total government debt less than 60% of GDP) but was able to join later.

Starting January 1, 1999, the exchange rates of countries entering the monetary union were fixed permanently to the euro (which became a unit of account), the European Central Bank took over monetary policy from the individual national central banks, and the governments of the member countries began to issue debt in euros. In early 2002, euro notes and coins began to circulate and by June 2002, the old national

currencies were phased out completely, so that only euros could be used in the member countries.

Advocates of monetary union point out the advantages that the single currency has in eliminating the transaction costs incurred in exchanging one currency for another. In addition, the use of a single currency may promote further integration of the European economies and enhance competition. Skeptics who think that monetary union may be bad for Europe suggest that because labor will not be very mobile across national boundaries and because fiscal transfers (i.e., tax income from one region being spent on another) from better-performing regions to worse-performing regions will not take place as occurs in the United States, a single currency may lead to some regions of Europe being depressed for substantial periods of time while other regions are booming.

Whether the euro will be good for the economies of Europe and increase their GDP is an open question. However, the motive behind monetary union was probably more political than economic. European monetary union may encourage political union, producing a unified Europe that can play a stronger economic and political role on the world stage.

take place without the need to carry around large amounts of currency. The introduction of checks was a major innovation that improved the efficiency of the payments system. Frequently, payments made back and forth cancel each other; without checks, this would involve the movement of a lot of currency. With checks, payments that cancel each other can be settled by canceling the checks, and no currency need be moved. The use of checks thus reduces the transportation costs associated with the payments system and improves economic efficiency. Another advantage of checks is that they can be written for any amount up to the balance in the account, making transactions for large amounts much easier. Checks are also advantageous in that loss from theft is greatly reduced, and because they provide convenient receipts for purchases.

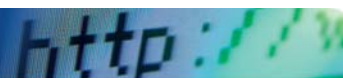
There are, however, two problems with a payments system based on checks. First, it takes time to get checks from one place to another, a particularly serious problem if you are paying someone in a different location who needs to be paid quickly. In addition, if you have a checking account, you know that it usually takes several business days before a bank will allow you to make use of the funds from a check you have deposited. If your need for cash is urgent, this feature of paying by check can be

frustrating. Second, all the paper shuffling required to process checks is costly; it is estimated that it currently costs over \$10 billion per year to process all the checks written in the United States.

Electronic Payment

The development of inexpensive computers and the spread of the Internet now make it cheap to pay bills electronically. In the past, you had to pay your bills by mailing a check, but now banks provide a web site in which you just log on, make a few clicks, and thereby transmit your payment electronically. Not only do you save the cost of the stamp, but paying bills becomes (almost) a pleasure, requiring little effort. Electronic payment systems provided by banks now even spare you the step of logging on to pay the bill. Instead, recurring bills can be automatically deducted from your bank account. Estimated cost savings when a bill is paid electronically rather than by a check exceed one dollar. Electronic payment is thus becoming far more common in the United States, but Americans lag considerably behind Europeans, particularly Scandinavians, in their use of electronic payments (see Box 2).

Box 2: E-Finance



Why Are Scandinavians So Far Ahead of Americans in Using Electronic Payments?

Americans are the biggest users of checks in the world. Close to 100 billion checks are written every year in the United States, and over three-quarters of noncash transactions are conducted with paper. In contrast, in most countries of Europe, more than two-thirds of noncash transactions are electronic, with Finland and Sweden having the greatest proportion of online banking customers of any countries in the world. Indeed, if you were Finnish or Swedish, instead of writing a check, you would be far more likely to pay your bills online, using a personal computer or even a mobile phone. Why do Europeans and especially Scandinavians so far outpace Americans in the use of electronic payments?

First, Europeans got used to making payments without checks even before the advent of the personal computer. Europeans have long made use of so-called *giro* payments, in which banks and post offices transfer funds for customers to pay bills. Second, Europeans—and particularly Scandinavians—are much greater users of mobile phones and the Internet than are Americans. Finland has the highest per capita use of mobile phones in the world, and Finland and Sweden lead the world in the percentage of the population that accesses the Internet. Maybe these usage

patterns stem from the low population densities of these countries and the cold and dark winters that keep Scandinavians inside at their PCs. For their part, Scandinavians would rather take the view that their high-tech culture is the product of their good education systems and the resulting high degree of computer literacy, the presence of top technology companies such as Finland's Nokia and Sweden's Ericsson, and government policies promoting the increased use of personal computers, such as Sweden's tax incentives for companies to provide their employees with home computers. The wired populations of Finland and Sweden are (percentage-wise) the biggest users of online banking in the world.

Americans are clearly behind the curve in their use of electronic payments, which has imposed a high cost on the U.S. economy. Switching from checks to electronic payments might save the U.S. economy tens of billions of dollars per year, according to some estimates. Indeed, the U.S. federal government is trying to switch all its payments to electronic ones by directly depositing them into bank accounts, in order to reduce its expenses. Can Americans be weaned from paper checks and fully embrace the world of high-tech electronic payments?

E-Money

Electronic payments technology can not only substitute for checks, but can substitute for cash, as well, in the form of **electronic money** (or **e-money**), money that exists only in electronic form. The first form of e-money was the *debit card*. Debit cards, which look like credit cards, enable consumers to purchase goods and services by electronically transferring funds directly from their bank accounts to a merchant's account. Debit cards are used in many of the same places that accept credit cards and are now often becoming faster to use than cash. At most supermarkets, for example, you can swipe your debit card through the card reader at the checkout station, press a button, and the amount of your purchases is deducted from your bank account. Most banks and companies such as Visa and MasterCard issue debit cards, and your ATM card typically can function as a debit card.

A more advanced form of e-money is the *stored-value card*. The simplest form of stored-value card is purchased for a preset dollar amount that the consumer pays up front, like a prepaid phone card. The more sophisticated stored-value card is known as a **smart card**. It contains a computer chip that allows it to be loaded with digital cash from the owner's bank account whenever needed. Smart cards can be loaded from ATM machines, personal computers with a smart card reader, or specially equipped telephones.

A third form of electronic money is often referred to as **e-cash**, which is used on the Internet to purchase goods or services. A consumer gets e-cash by setting up an account with a bank that has links to the Internet and then has the e-cash transferred to her PC. When she wants to buy something with e-cash, she surfs to a store on the Web and clicks the "buy" option for a particular item, whereupon the e-cash is automatically transferred from her computer to the merchant's computer. The merchant can then have the funds transferred from the consumer's bank account to his before the goods are shipped.

Given the convenience of e-money, you might think that we would move quickly to the cashless society in which all payments were made electronically. However, this hasn't happened, as discussed in Box 3.

Measuring Money

The definition of money as anything that is generally accepted in payment for goods and services tells us that money is defined by people's behavior. What makes an asset money is that people believe it will be accepted by others when making payment. As we have seen, many different assets have performed this role over the centuries, ranging from gold to paper currency to checking accounts. For that reason, this behavioral definition does not tell us exactly what assets in our economy should be considered money. To measure money, we need a precise definition that tells us exactly what assets should be included.

The Federal Reserve's Monetary Aggregates

The Federal Reserve System (the Fed), the central banking authority responsible for monetary policy in the United States, has conducted many studies on how to measure money. The problem of measuring money has recently become especially crucial because extensive financial innovation has produced new types of assets that might properly belong in a measure of money. Since 1980, the Fed has modified its measures of money several times and has settled on the following measures of the money

Box 3: E-Finance

Are We Headed for a Cashless Society?

Predictions of a cashless society have been around for decades, but they have not come to fruition. For example, *Business Week* predicted in 1975 that electronic means of payment “would soon revolutionize the very concept of money itself,” only to reverse itself several years later. Pilot projects in recent years with smart cards to convert consumers to the use of e-money have not been a success. Mondex, one of the widely touted, early stored-value cards that was launched in Britain in 1995, is only used on a few British university campuses. In Germany and Belgium, millions of people carry bank cards with computer chips embedded in them that enable them to make use of e-money, but very few use them. Why has the movement to a cashless society been so slow in coming?

Although e-money might be more convenient and may be more efficient than a payments system based on paper, several factors work against the disappearance of the paper system. First, it is very expensive to set up the computer, card reader, and telecommunications networks necessary to make electronic money

the dominant form of payment. Second, electronic means of payment raise security and privacy concerns. We often hear media reports that an unauthorized hacker has been able to access a computer database and to alter information stored there. Because this is not an uncommon occurrence, unscrupulous persons might be able to access bank accounts in electronic payments systems and steal funds by moving them from someone else’s accounts into their own. The prevention of this type of fraud is no easy task, and a whole new field of computer science has developed to cope with security issues. A further concern is that the use of electronic means of payment leaves an electronic trail that contains a large amount of personal data on buying habits. There are worries that government, employers, and marketers might be able to access these data, thereby encroaching on our privacy.

The conclusion from this discussion is that although the use of e-money will surely increase in the future, to paraphrase Mark Twain, “the reports of cash’s death are greatly exaggerated.”

www.federalreserve.gov/releases/h6/Current/

The Federal Reserve reports the current levels of M1, M2, and M3 on its web site.

supply, which are also referred to as **monetary aggregates** (see Table 1 and the Following the Financial News box).

The narrowest measure of money that the Fed reports is **M1**, which includes currency, checking account deposits, and traveler’s checks. These assets are clearly money, because they can be used directly as a medium of exchange. Until the mid-1970s, only commercial banks were permitted to establish checking accounts, and they were not allowed to pay interest on them. With the financial innovation that has occurred (discussed more extensively in Chapter 9), regulations have changed so that other types of banks, such as savings and loan associations, mutual savings banks, and credit unions, can also offer checking accounts. In addition, banking institutions can offer other checkable deposits, such as NOW (negotiated order of withdrawal) accounts and ATS (automatic transfer from savings) accounts, that do pay interest on their balances. Table 1 lists the assets included in the measures of the monetary aggregates; both demand deposits (checking accounts that pay no interest) and these other checkable deposits are included in the M1 measure.

The **M2** monetary aggregate adds to M1 other assets that have check-writing features (money market deposit accounts and money market mutual fund shares) and other assets (savings deposits, small-denomination time deposits and repurchase agreements) that are extremely liquid, because they can be turned into cash quickly at very little cost.

Table 1 Measures of the Monetary Aggregates

	Value as of December 2002 (\$billions)
M1 = Currency	626.5
+ Traveler's checks	7.7
+ Demand deposits	290.7
+ Other checkable deposits	281.2
Total M1	<u>1,206.1</u>
M2 = M1	
+ Small-denomination time deposits and repurchase agreements	1,332.3
+ Savings deposits and money market deposit accounts	2,340.4
+ Money market mutual fund shares (noninstitutional)	923.7
Total M2	<u>5,802.5</u>
M3 = M2	
+ Large-denomination time deposits and repurchase agreements	1,105.2
+ Money market mutual fund shares (institutional)	767.7
+ Repurchase agreements	511.7
+ Eurodollars	341.1
Total M3	<u>8,528.2</u>

Source: www.federalreserve.gov/releases/h6/hist.

Note: The *Travelers checks* item includes only traveler's checks issued by non-banks, while traveler's checks issued by banks are included in the *Demand deposits* item, which also includes checkable deposits to businesses and which also do not pay interest.

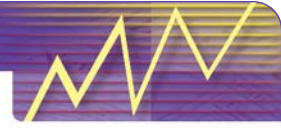
The **M3** monetary aggregate adds to M2 somewhat less liquid assets such as large-denomination time deposits and repurchase agreements, Eurodollars, and institutional money market mutual fund shares.

Because we cannot be sure which of the monetary aggregates is the true measure of money, it is logical to wonder if their movements closely parallel one another. If they do, then using one monetary aggregate to predict future economic performance and to conduct policy will be the same as using another, and it does not matter much that we are not sure of the appropriate definition of money for a given policy decision. However, if the monetary aggregates do not move together, then what one monetary aggregate tells us is happening to the money supply might be quite different from what another monetary aggregate would tell us. The conflicting stories might present a confusing picture that would make it hard for policymakers to decide on the right course of action.

Figure 1 plots the growth rates M1, M2, and M3 from 1960 to 2002. The growth rates of these three monetary aggregates do tend to move together; the timing of their rise and fall is roughly similar until the 1990s, and they all show a higher growth rate on average in the 1970s than in the 1960s.

Yet some glaring discrepancies exist in the movements of these aggregates. According to M1, the growth rate of money did not accelerate between 1968, when it

Following the Financial News



The Monetary Aggregates

Data for the Federal Reserve's monetary aggregates (M1, M2, and M3) are published every Friday. In the *Wall Street Journal*, the data are found in the "Federal Reserve Data" column, an example of which is presented here.

The third entry indicates that the money supply (M2) averaged \$5,822.7 billion for the week ending

December 23, 2002. The notation "sa" for this entry indicates that the data are seasonally adjusted; that is, seasonal movements, such as those associated with Christmas shopping, have been removed from the data. The notation "nsa" indicates that the data have not been seasonally adjusted.

FEDERAL RESERVE DATA

MONETARY AGGREGATES (daily average in billions)		4 Weeks Ended:		Month	
1 Week Ended:		Dec. 23	Nov. 25	Nov.	Oct.
Dec. 23	Dec. 16	Dec. 23	Nov. 25	Nov.	Oct.
Money supply (M1) sa . . .	1227.1	1218.3	1197.5	1200.7	1199.6
Money supply (M1) nsa . . .	1256.0	1230.9	1195.9	5800.7	5753.8
Money supply (M2) sa . . .	5822.7	5815.5	5795.8	8485.2	8348.4
Money supply (M2) nsa . . .	5834.5	5835.7	5780.7	nsa-Not seasonally adjusted	
Money supply (M3) sa . . .	8542.8	8543.4	8465.4	sa-Seasonally adjusted.	
Money supply (M3) nsa . . .	8572.6	8578.1	8440.5		

Source: *Wall Street Journal*, Friday, January 3, 2003, p. C10.

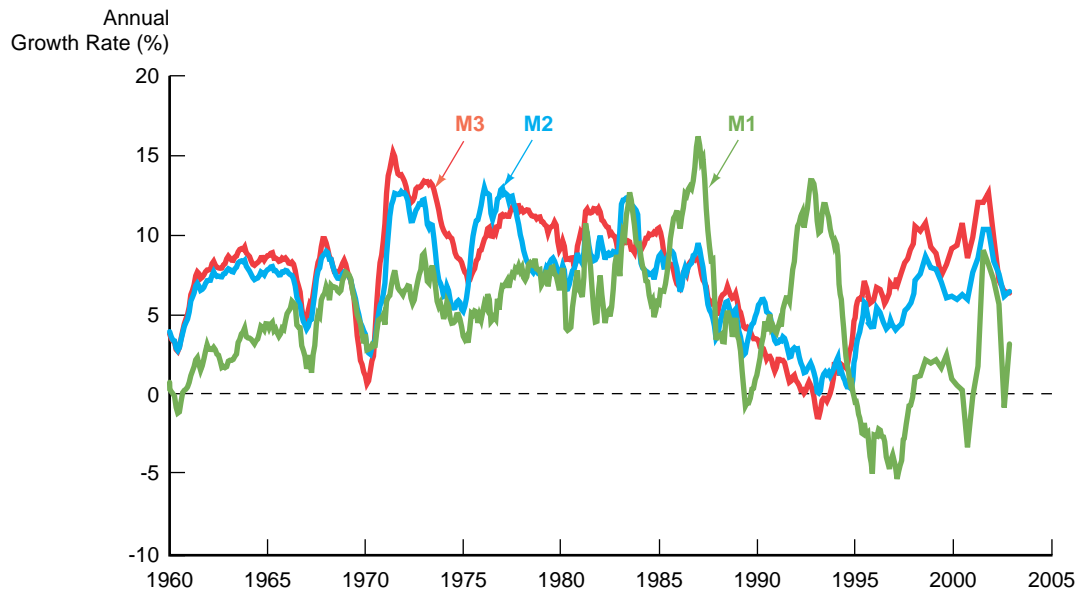


FIGURE 1 Growth Rates of the Three Money Aggregates, 1960–2002

Sources: Federal Reserve *Bulletin*, p. A4, Table 1.10, various issues; Citibase databank; www.federalreserve.gov/releases/h6/hist/h6hist1.txt.

was in the 6–7% range, and 1971, when it was at a similar level. In the same period, the M2 and M3 measures tell a different story; they show a marked acceleration from the 8–10% range to the 12–15% range. Similarly, while the growth rate of M1 actually increased from 1989 to 1992, the growth rates of M2 and M3 in this same period instead showed a downward trend. Furthermore, from 1992 to 1998, the growth rate of M1 fell sharply while the growth rates of M2 and M3 rose substantially; from 1998 to 2002, M1 growth generally remained well below M2 and M3 growth. Thus, the different measures of money tell a very different story about the course of monetary policy in recent years.

From the data in Figure 1, you can see that obtaining a single precise, correct measure of money does seem to matter and that it does make a difference which monetary aggregate policymakers and economists choose as the true measure of money.

How Reliable Are the Money Data?

The difficulties of measuring money arise not only because it is hard to decide what is the best definition of money, but also because the Fed frequently later revises earlier estimates of the monetary aggregates by large amounts. There are two reasons why the Fed revises its figures. First, because small depository institutions need to report the amounts of their deposits only infrequently, the Fed has to estimate these amounts until these institutions provide the actual figures at some future date. Second, the adjustment of the data for seasonal variation is revised substantially as more data become available. To see why this happens, let's look at an example of the seasonal variation of the money data around Christmas-time. The monetary aggregates always rise around Christmas because of increased spending during the holiday season; the rise is greater in some years than in others. This means that the factor that adjusts the data for the seasonal variation due to Christmas must be estimated from several years of data, and the estimates of this seasonal factor become more precise only as more data become available. When the data on the monetary aggregates are revised, the seasonal adjustments often change dramatically from the initial calculation.

Table 2 shows how severe a problem these data revisions can be. It provides the rates of money growth from one-month periods calculated from initial estimates of the M2 monetary aggregate, along with the rates of money growth calculated from a major revision of the M2 numbers published in February 2003. As the table shows, for one-month periods the initial versus the revised data can give a different picture of what is happening to monetary policy. For January 2003, for example, the initial data indicated that the growth rate of M2 at an annual rate was 2.2%, whereas the revised data indicate a much higher growth rate of 5.4%.

A distinctive characteristic shown in Table 2 is that the differences between the initial and revised M2 series tend to cancel out. You can see this by looking at the last row of the table, which shows the average rate of M2 growth for the two series and the average difference between them. The average M2 growth for the initial calculation of M2 is 6.5%, and the revised number is 6.5%, a difference of 0.0%. The conclusion we can draw is that the initial data on the monetary aggregates reported by the Fed are not a reliable guide to what is happening to short-run movements in the money supply, such as the one-month growth rates. However, the initial money data are reasonably reliable for longer periods, such as a year. The moral is that ***we probably should not pay much attention to short-run movements in the money supply numbers, but should be concerned only with longer-run movements.***

Table 2 Growth Rate of M2: Initial and Revised Series, 2002
(percent, compounded annual rate)

Period	Initial Rate	Revised Rate	Difference (Revised Rate – Initial Rate)
January	2.2	5.4	3.2
February	6.8	8.7	1.9
March	-1.4	0.2	1.6
April	-4.0	-2.6	1.4
May	14.8	15.4	0.6
June	7.6	7.1	-0.5
July	13.6	11.0	-2.6
August	9.9	8.6	-1.3
September	5.1	5.7	0.6
October	10.9	8.3	-2.6
November	10.2	8.0	-2.2
December	<u>2.8</u>	<u>2.8</u>	<u>0.0</u>
Average	6.5	6.5	0.0

Source: Federal Reserve Statistical Release H.6: www.federalreserve.gov/releases/h6.

Summary

- To economists, the word *money* has a different meaning from *income* or *wealth*. Money is anything that is generally accepted as payment for goods or services or in the repayment of debts.
- Money serves three primary functions: as a medium of exchange, as a unit of account, and as a store of value. Money as a medium of exchange avoids the problem of double coincidence of wants that arises in a barter economy by lowering transaction costs and encouraging specialization and the division of labor. Money as a unit of account reduces the number of prices needed in the economy, which also reduces transaction costs. Money also functions as a store of value, but performs this role poorly if it is rapidly losing value due to inflation.
- The payments system has evolved over time. Until several hundred years ago, the payments system in all but the most primitive societies was based primarily on precious metals. The introduction of paper currency lowered the cost of transporting money. The next major advance was the introduction of checks, which lowered transaction costs still further. We are currently moving toward an electronic payments system in which paper is eliminated and all transactions are handled by computers. Despite the potential efficiency of such a system, obstacles are slowing the movement to the checkless society and the development of new forms of electronic money.
- The Federal Reserve System has defined three different measures of the money supply—M1, M2, and M3. These measures are not equivalent and do not always move together, so they cannot be used interchangeably by policymakers. Obtaining the precise, correct measure of money does seem to matter and has implications for the conduct of monetary policy.
- Another problem in the measurement of money is that the data are not always as accurate as we would like.

Substantial revisions in the data do occur; they indicate that initially released money data are not a reliable guide to short-run (say, month-to-month) movements

in the money supply, although they are more reliable over longer periods of time, such as a year.



Key Terms

commodity money, p. 48	liquidity, p. 47	payments system, p. 48
currency, p. 44	M1, p. 52	smart card, p. 51
e-cash, p. 51	M2, p. 52	store of value, p. 47
electronic money (e-money), p. 51	M3, p. 53	unit of account, p. 46
fiat money, p. 48	medium of exchange, p. 45	wealth, p. 45
hyperinflation, p. 47	monetary aggregates, p. 52	
income, p. 45		



Questions and Problems

Questions marked with an asterisk are answered at the end of the book in an appendix, “Answers to Selected Questions and Problems.”

- Which of the following three expressions uses the economists’ definition of money?
 - “How much money did you earn last week?”
 - “When I go to the store, I always make sure that I have enough money.”
 - “The love of money is the root of all evil.”
- There are three goods produced in an economy by three individuals:

<i>Good</i>	<i>Producer</i>
Apples	Orchard owner
Bananas	Banana grower
Chocolate	Chocolatier

If the orchard owner likes only bananas, the banana grower likes only chocolate, and the chocolatier likes only apples, will any trade between these three persons take place in a barter economy? How will introducing money into the economy benefit these three producers?
- Why did cavemen not need money?
- Why were people in the United States in the nineteenth century sometimes willing to be paid by check rather than with gold, even though they knew that there was a possibility that the check might bounce?
- In ancient Greece, why was gold a more likely candidate for use as money than wine was?
- Was money a better store of value in the United States in the 1950s than it was in the 1970s? Why or why not? In which period would you have been more willing to hold money?
- Would you be willing to give up your checkbook and instead use an electronic means of payment if it were made available? Why or why not?
- Rank the following assets from most liquid to least liquid:
 - Checking account deposits
 - Houses
 - Currency
 - Washing machines
 - Savings deposits
 - Common stock
- Why have some economists described money during a hyperinflation as a “hot potato” that is quickly passed from one person to another?
- In Brazil, a country that was undergoing a rapid inflation before 1994, many transactions were conducted in dollars rather than in reals, the domestic currency. Why?

- *11. Suppose that a researcher discovers that a measure of the total amount of debt in the U.S. economy over the past 20 years was a better predictor of inflation and the business cycle than M1, M2, or M3. Does this discovery mean that we should define money as equal to the total amount of debt in the economy?
12. Look up the M1, M2, and M3 numbers in the Federal Reserve *Bulletin* for the most recent one-year period. Have their growth rates been similar? What implications do their growth rates have for the conduct of monetary policy?
- *13. Which of the Federal Reserve's measures of the monetary aggregates, M1, M2, or M3, is composed of the most liquid assets? Which is the largest measure?
14. For each of the following assets, indicate which of the monetary aggregates (M1, M2, M3) includes them:
- Currency
 - Money market mutual funds
 - Eurodollars
 - Small-denomination time deposits
 - Large-denomination repurchase agreements
 - Checkable deposits
- *15. Why are revisions of monetary aggregates less of a problem for measuring long-run movements of the money supply than they are for measuring short-run movements?

Web Exercises



- Go to www.federalreserve.gov/releases/h6/Current/.
 - What has been the growth rate in M1, M2, and M3 over the last 12 months?
 - From what you know about the state of the economy, does this seem expansionary or restrictive?
- Go to www.federalreserve.gov/paymentsys.htm and select one topic on which the Federal Reserve has a written policy. Write a one-paragraph summary of this policy.